CLAIMS:

1. A localized plasmon resonance sensor comprising:

a sensor unit having a metal layer with convex parts or concave parts formed on a surface of a transparent substrate, and molecule recognition functional substance for attaching a specific analyte immobilized on the substrate or the metal layer; wherein

the surface arranged with the metal layer and the molecule recognition functional substances of the sensor unit is contacted to an analysis sample solution containing analyte modified with a light emitting molecule, and an excitation light is irradiated onto the other surface of the sensor unit.

2. The localized plasmon resonance sensor according to claim 1, wherein the excitation light is irradiated onto the sensor unit at an incident angle totally reflected at the surface of the substrate.

3. The localized plasmon resonance sensor according to claim 2, wherein a prism is arranged closely attached to the back surface of the substrate.

4. The localized plasmon resonance sensor according to claim 1, wherein a light detector is arranged by way of a lens on the side facing the surface arranged with the metal layer and the molecule recognition functional substances of the sensor unit.

5. The localized plasmon resonance sensor according to claim 1, wherein the emission wavelength of the light emitting molecule and the wavelength of the excitation light are different.

6. The localized plasmon resonance sensor according to claim 5, wherein a cut filter for shielding the excitation light is arranged in front of the

light detector.

7. The localized plasmon resonance sensor according to claim 1, wherein the metal layer with the convex parts is made of metal fine particles fixed spaced apart on the surface of the substrate.

8. The localized plasmon resonance sensor according to claim 1, wherein the metal layer with the convex parts includes a metal thin film formed on the surface of the substrate and metal fine particles fixed spaced apart on the metal thin film.

9. The localized plasmon resonance sensor according to claim 1, wherein the metal layer with the convex parts includes metal fine particles fixed spaced apart on the metal thin film and a metal thin film formed on the surface of the substrate from above the metal fine particles.

10. The localized plasmon resonance sensor according to claim 1, wherein the metal layer with the concave parts is formed with concave parts spaced apart in the metal thin film formed on the surface of the substrate.

11. The localized plasmon resonance sensor according to claim 1, wherein the concave parts and the concave parts are formed by embossing the metal thin film formed on the surface of the substrate with a stamper.

12. The localized plasmon resonance sensor according to claim 1, wherein the height and the width of the convex part or the concave part are both less than or equal to 150nm.

13. The localized plasmon resonance sensor according to claim 1, wherein the shape of the convex part is a sphere, an elliptical sphere, or one part of the sphere or the elliptical sphere.

14. The localized plasmon resonance sensor according to claim 1,

wherein the average value of the distance between the convex parts or the concave parts is greater than or equal to two times and less than or equal to four times the outside dimension of the convex part or the concave part.

15. The localized plasmon resonance sensor according to claim 1, wherein the metal layer comprises Au or Ag.

16. The localized plasmon resonance sensor according to claim 1, wherein hydrophilic process, hydrophobic process, or charging process is performed on one region of the substrate or the metal layer, and the molecule recognition functional substances are immobilized at the region not performed with the process.

17. The localized plasmon resonance sensor according to claim 1, wherein the mol concentration of the light emitting molecule is greater than or equal to 100nM.

18. The localized plasmon resonance sensor according to claim 1, further comprising a flow path for flowing the analysis sample solution, wherein the molecule recognition functional substances face the inside of the flow path.

19. The localized plasmon resonance sensor according to claim 1, wherein the sensor unit includes a plurality of regions to be introduced with the analysis sample solution, each region being immobilized with the molecule recognition functional substance different from each other.

20. An examining device comprising a localized plasmon resonance sensor according to claim 1, and a means for analyzing an analysis sample solution based on output data of the sensor.

21. A measurement method using a localized plasmon resonance sensor including a sensor unit having a metal layer with convex parts or concave parts

formed on a surface of a transparent substrate and molecule recognition functional substance for attaching a specific analyte immobilized on the substrate or the metal layer; the method comprising the steps of:

forming an analysis sample solution by mixing a solution to be measured and a light emitting molecule;

contacting the sample solution to the surface arranged with the metal layer and the molecule recognition functional substances of the sensor unit;

irradiating an excitation light to a surface not arranged with the metal layer and the molecule recognition functional substances of the sensor unit;

detecting emission intensity of the light emitting molecule light emitted by an electric field generated by the excitation light; and

calculating the presence and the concentration of the analyte from the emission intensity.

22. The measurement method according to claim 21, wherein the solution to be measured is body fluid of human or animal, and the analyte is a biomolecule including at least one of gene, protein, sugar chain or cell.